



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,340	02/25/2004	Hiroyuki Akatsu	FIS920030411US1	2339
32074 7590 11/13/2007 INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533			EXAMINER NGUYEN, DAO H	
			ART UNIT	PAPER NUMBER
			2818	
			MAIL DATE	DELIVERY MODE
			11/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/708,340

Applicant(s)

AKATSU ET AL.

Examiner

Dao H. Nguyen

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8, 10 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8, 10 and 21-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the communications dated 09/17/2007.
Claims 8, 10, and 21-23 are active in this application.
Claim(s) 1-7, 9, and 11-20 have been cancelled.

Remarks

2. Applicants' argument(s) has/have been fully considered, but is/are moot in view of Taka et al., US 4,975,381.

Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim(s) 8, 10, and 21-23 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Mochizuki et al. (US 5,481,120) in view of Harame et al. (US 5,101,256).**

Regarding claim 8, Mochizuki discloses a bipolar transistor, as shown in figs. 27-30, comprising:

a collector 3 including a frustum-shaped collector pedestal 3 having an at least substantially planar upper surface extending in lateral directions, a lower surface, and a slanted sidewall extending between said upper surface and said lower surface, wherein said upper surface has an area substantially less than an area of said lower surface;

an intrinsic base 5 overlying all of said area of said upper surface of said collector pedestal 3;

an emitter 8 overlying said intrinsic base 5;

an extrinsic base 6&16 conductively connected to said intrinsic base 5; and

a (second) dielectric region 21 laterally adjacent to said collector pedestal 3,

wherein an opening extends through said (second) dielectric regions 21, said opening defining an edge of said (second) dielectric region 21, said edge being aligned with sides walls of said emitter 8 in a vertical direction transverse to said lateral directions, said collector pedestal 3 having an edge referenced to said edge of said (second) dielectric region 21, such that said emitter 8 is aligned with said collector pedestal 3.

Mochizuki does not expressly teach a (first) dielectric region laterally adjacent to said emitter wherein an opening extends through said (first) dielectric region and defines an edge of said (first) dielectric region to be aligned with the edge of said (second) dielectric region in a vertical direction transverse to said lateral directions, said emitter having an edge referenced to said edge of said (first) dielectric region.

Haramé discloses a bipolar transistor, as shown in figs 1A-C, comprising an emitter 40 overlying an intrinsic base 32 wherein a (first) dielectric region 28/34/36 being laterally adjacent to the emitter 40 and formed in the space between the emitter 40 and extrinsic base and base contact 32B/24/44 to isolate the emitter 40 from the extrinsic base and base contact 32B/24/44, wherein an opening extends through said (first) dielectric region 28/34/36, said emitter 40 having an edge referenced to said edge of said (first) dielectric region 34/36.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Mochizuki so that it would further include a (first) dielectric region laterally adjacent to the emitter 8 and formed in the space between the emitter 8 and extrinsic base/base contact 6&16, as that taught by Haramé in order to provide isolation between the emitter and the extrinsic base/base contact, hence to increase the performance and reliability of the transistor. By further including said (first) dielectric region in the discussed manner, all of the claimed features relating to the (first) dielectric region would be met.

Regarding claim 10, Mochizuki/Haramé discloses the bipolar transistor wherein said intrinsic base 5 includes a layer of a single-crystal semiconductor which forms a heterojunction with at least one of said emitter and said collector pedestal. See figs. 30 of Mochizuki.

Regarding claim 21, Mochizuki/Haramé discloses the bipolar transistor further comprising a conductive collector contact via 46, said collector further including a single-crystal semiconductor region 12 having a first active area underlying said lower surface of said collector pedestal 14 and a second active area separated in at least one of said lateral directions from said first active area by a shallow trench isolation 18C extending to a depth below said lower surface of said collector pedestal wherein said collector contact via overlies said second active area. See figs. 1A-C of Haramé.

Regarding claim 22, Mochizuki/Haramé discloses the bipolar transistor wherein at least a portion of said extrinsic base is raised above an upper surface of said intrinsic base, wherein an edge of said raised portion of said extrinsic base is aligned in the vertical direction with said edges of said first and second dielectric regions. See figs. 27-30 of Mochizuki, and figs. 1 of Haramé.

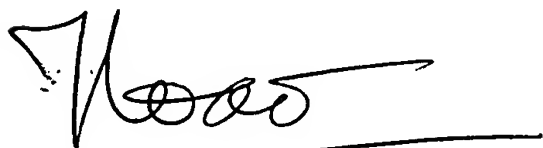
Regarding claim 23, Mochizuki/Haramé discloses the bipolar transistor further comprising a solid dielectric spacer 34/36A/B spacing said raised portion of said extrinsic base 32B from said emitter 40, said solid dielectric spacer including (a) a first dielectric spacer 34 wholly contacting a wall of said raised portion of said extrinsic base 32B, and (b) a second dielectric spacer 36A/B contacting an inner wall of said first dielectric spacer 34 remote from said raised portion of said extrinsic base 32B. See figs. 1 of Haramé.

Conclusion

5. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao H. Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday, 9:00 AM – 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke, can be reached on (571)272-1657. The fax numbers for all communication(s) is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

A handwritten signature in black ink, appearing to read 'Dao H. Nguyen', is written over a horizontal line.

Dao H. Nguyen
Art Unit 2818
November 02, 2007